2011 DOE SOLID-STATE LIGHTING MARKET INTRODUCTION WORKSHOP

July 13–14, 2011

The Conference Center at Convention Place • Seattle, WA

Final Workshop Agenda

DAY 1 — Wednesday, July 13

7:00 a.m.	*Registration and Continental Breakfast*
8:00 a.m.	**Welcome & Introduction** *James Brodrick, U.S. Department of Energy* *Bruce Harrell, Seattle City Council*
8:30 a.m.	**Commercial Ambient Lighting: Can LEDs Compete?** The overhead ambient lighting in large interior commercial spaces—like offices and common areas—consumes massive amounts of energy, and many are looking at LED lighting solutions to dramatically reduce that energy use. This panel will explore the products, economics, and issues related to the use of LED lighting in such spaces, including a discussion of lighting requirements, fluorescent vs. LED comparisons, a recent GATEWAY study on LED T8 replacement lamps, and newly introduced integral LED luminaires. Moderator: *Marc Ledbetter, Pacific Northwest National Laboratory* *Eric Richman, Pacific Northwest National Laboratory* *Colleen Pastore, Philips Lightolier* *Gary Trott, Cree LED Lighting Solutions*
10:00 a.m.	*Break*
10:30 a.m.	**A Rising Tide: The Latest on LED Replacement Lamps** More and more LED screw-in replacement lamps are coming to market, with a notable increase in output. Yet DOE testing and analysis reveal that not all LED replacement lamps match the performance of the products they are intended to replace, in terms of output, color quality, and light distribution. Find out what the latest Lighting Facts® Product Snapshot tells us about replacement products and trends, and what we can learn from a new CALiPER study on products available on retail shelves. Moderator: *John Rivera, D&R International* *Jason West, D&R International* *Kelly Gordon, Pacific Northwest National Laboratory* *Marc Maldoff, Lowe's*
12:00 p.m.	*Lunch*
1:00 p.m.	**DOE Partner Forum** This panel will highlight partnership opportunities between DOE and utilities, regional efficiency organizations, retailers, designers, and others—with insights from partners on critical issues and strategies for success. The discussion in this Partner Forum will set the stage for more in-depth conversations at the evening reception and poster session. Moderator: *James Brodrick, U.S. Department of Energy* *Bill Hamilton, The Home Depot* *Jon Linn, Northeast Energy Efficiency Partnerships* *Dan Mellinger, Efficiency Vermont* *Jeff Miller, Jeff Miller and Company*

2:30 p.m.	**Recognition for Lighting Facts® Partners** Shining a spotlight on a few select Lighting Facts manufacturer, retailer, and professional partners who have demonstrated the value of integrating Lighting Facts into their LED product selection process. *James Brodrick, U.S. Department of Energy*
3:00 p.m.	*Break*
3:30 p.m.	**Lessons from the Field** Lessons from real-world applications continually expand our knowledge of LED technology and related issues. This panel will share perspectives from large purchasers like municipalities and federal agencies on selecting and implementing LED products—what do they look for in LED products, and what hurdles must LEDs overcome to gain widespread acceptance? Moderator: *Bruce Kinzey, Pacific Northwest National Laboratory* *Paul Kistler, United States Navy* *Kevin Powell, U.S. General Services Administration* *Edward Smalley, Seattle City Light*
5:00–7:00 p.m.	**Evening Reception/Partner Poster Session** The DOE Partner Forum continues with an evening reception and poster session, providing an opportunity to browse and ask questions of various DOE partners.

DAY 2 — Thursday, July 14

7:00 a.m.	*Registration and Continental Breakfast*
8:00 a.m.	**Updating the DOE Commercialization Support Plan** A preview of proposed updates to the DOE SSL Commercialization Support Plan. *Marc Ledbetter, Pacific Northwest National Laboratory*
8:30 a.m.	**Defining "Quality of Light"** Color quality and consistency are key to customer satisfaction, and evidence suggests that LED lighting quality is steadily improving. This panel will explore some of the reasons why—with a look at the science behind color quality, improvements in LED binning processes, and more—and share insights from some recent LED lighting installations. Moderator: *Eric Richman, Pacific Northwest National Laboratory* *Maria Thompson, OSRAM Sylvania* *Scott Rosenfeld, Smithsonian American Art Museum* *Daniel Salinas, Nelson Electric* *Chad Stalker, Philips Lumileds*
10:00 a.m.	*Break*
10:30 a.m.	**LED Driver Performance: Possibilities and Trade-Offs** The role of LED drivers in determining LED product performance and lifetime has come under increasing scrutiny of late. They are frequently referred to as the "weak link" in LED systems, and calls for improved performance are often met with laments about high costs and steep trade-offs. This panel of semiconductor integrated circuit (IC) manufacturers will

	review the challenges involved with designing LED driver solutions that have long lifetime, deep dimming, improved triac dimmer compatibility, high power factor, and low flicker. Learn what levels of performance are available now, what reasonable trade-offs to expect, and how to ask for luminaires with driver characteristics you value. Moderator: *Michael Poplawski, Pacific Northwest National Laboratory* *Matthew Reynolds, National Semiconductor* *Pantas Sutardja, Marvell Semiconductor* *Julian Zhu, NXP Semiconductors*
12:00 p.m.	*Lunch*
1:00 p.m.	**LED Product Reliability and Lifetime** Concerns about LED product lifetime claims abound, and while we are seeing fewer gross exaggerations, there is still a fair amount of over-representation regarding product lifetimes. This panel will share updates from a DOE working group focused on reliability and their efforts to develop industry consensus and best practices for describing lifetime more accurately. Learn about the issues surrounding true lifetime and reliability for LED packages and luminaires, how LED systems work, types of failures and failure modes, how color shift and electronics can affect useful life, and designing for system reliability. Moderator: *Marc Ledbetter, Pacific Northwest National Laboratory* *Fred Welsh, Radcliffe Advisors* *Terry Clark, Finelite* *Steve Paolini, Lunera Lighting*
2:30 p.m.	*Break*
3:00 p.m.	**SSL Product Prices: Trends, Technology Advances, and Trade-Offs** Solid-state lighting is evolving quickly, and prices are coming down fast. LED light output and efficacy are increasing, LEDs are being packaged in ever more innovative ways, and manufacturing processes are improving, all of which are contributing to reductions in luminaire prices. This panel will share DOE cost expectations for LED packages and luminaires, discuss technology changes that are driving prices down, and address performance and price trade-offs. What developments are having important impacts on luminaire prices? What are the performance trade-offs? Which products and applications make sense given the prices, and what types of customers are most likely to see the value? Moderator: *James Brodrick, U.S. Department of Energy* *Fred Welsh, Radcliffe Advisors* *Mark McClear, Cree* *Mark Hand, Acuity Brands Lighting*
4:30 p.m.	*Wrap-Up and Adjourn*
9:00 p.m.	**Optional Bus Tour of Outdoor Seattle LED Installations** Guided bus tour to see local outdoor LED installations; $15 per person. Seats are limited—advance registration recommended.